Achilles tendon ruptures operated on with percutaneous technique: Surgical results and post-operative complications

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Abstract

Introduction: Achilles tendon ruptures have increased considerably in recent years. Treatment of these lesions can be either conservative or surgical. Despite extensive literature, no gold standard exists. Surgical options include open surgery, mini-open surgery and percutaneous technique. The objective of this study was to characterize the clinical presentation and to report surgical results and complications in patients with ruptured Achilles tendon treated surgically with percutaneous technique.

Methods: A retrospective descriptive study was carried out. Adult patients were included, and clinical and epidemiological data were obtained. All patients were operated on with percutaneous technique using the Dresden Instrument.

Results: Sixty patients were enrolled. All presented pain, and 92% had also associated Thompson's sign and palpable gap. Complementary images were requested in 7 patients (12%). Average time until surgery was 4.28 days. Seven patients presented minor post-operative complications.

Conclusions: Achilles tendon ruptures are a prevalent pathology in older active population and weekend athletes. Diagnosis is mostly clinical; however, some patients may require complementary images for diagnosis. Strong evidence in the literature suggests that surgical treatment is superior to the classic conservative treatment. In comparison with open surgery, percutaneous technique has shown better aesthetic results and fewer complications.

Key words: Achilles tendon; percutaneous technique; surgical complications.
Level of Evidence: IV

Roturas del tendón de Aquiles operadas con técnica percutánea: resultados quirúrgicos y complicaciones posoperatorias

Resumen

Las roturas del tendón de Aquiles han aumentado considerablemente en los últimos años. El tratamiento de estas lesiones puede ser conservador o quirúrgico. Pese a la vasta literatura, no existe un "patrón de referencia" para el tratamiento de estas lesiones. Las opciones quirúrgicas incluyen la cirugía abierta, mini-invasiva y técnica percutánea. El objetivo de este estudio fue caracterizar la presentación clínica y mostrar los resultados quirúrgicos y las complicaciones en pacientes con rotura del tendón de Aquiles tratados con técnica percutánea.

Conflict of interests: The authors have reported none.

Materiales y Métodos: Se realizó un estudio descriptivo retrospectivo. Se incluyeron pacientes adultos y se obtuvieron datos clínicos y epidemiológicos. Todos fueron operados con técnica percutánea con raquetas de Dresden.
Resultados: Se incluyó a 60 pacientes. Todos tenían dolor y el 92% presentaba también signo de Thompson y brecha palpable. A 7 pacientes (12%) se les solicitaron imágenes complementarias. El tiempo promedio hasta la cirugía fue de 4.28 días. Siete pacientes sufrieron complicaciones posoperatorias menores.
Conclusiones: Las roturas del tendón de Aquiles son una patología prevalente en la población activa de mayor edad y en deportistas de fin de semana. El diagnóstico es clínico; sin embargo, algunos pacientes pueden requerir imágenes complementarias para el diagnóstico. La evidencia nos demuestra que el tratamiento quirúrgico es superior al tratamiento conservador clásico. En comparación con la técnica abierta, la técnica percutánea logra mejores resultados estéticos y menos complicaciones.

Palabras clave: Tendón de Aquiles; técnica percutánea; complicaciones quirúrgicas.
Nivel de Evidencia: IV

Introduction

The Achilles tendon is the largest and strongest tendon in the body.[1] It is formed by fibres coming from the gastrocnemius and soleus muscles, with a paratenon highly vascularized. Vascularization is given by the posterior tibial artery in its proximal and distal ends, leaving a 2 x 6 cm island in its distal insertion vascularized by the fibular artery.[2] This region is considered to be hypovascularized and the one where up to 75% of all the ruptures of the Achilles tendon occur.[3]

The incidence of these injuries has increased considerably—over the past 30 years it has reached 5-18 cases per 100,000inhabitants.[4] It prevails in the male sex reaching an up to 20:1 male: female ratio, according to different studies.[3,5]

The different therapeutic alternatives for these lesions can be divided into conservative and surgical. Conservative treatment includes immobilization plus casting or functional rehabilitation. Surgical options are open surgery, mini-invasive surgery and percutaneous techniques. Both therapeutic modalities have pros and cons, and there is neither agreement on treatment nor reference patterns, despite the voluminous literature about the issue.[3]

The aim of this study was to characterize the clinical profile of the rupture of the Achilles tendon, and show surgical results plus the complications associated with this surgical technique while comparing them with those in current literature.

Materials and Methods

We carried out a retrospective descriptive study of the case-series type. Between January 2013 and March 2016, we included the patients who at the time of their lesion had already turned 18 years old, had had clinical diagnosis of rupture of the Achilles tendon and had been operated on at Clínica Universitaria Puerto Montt by a sole orthopaedist specialized in ankle-foot surgery.

We excluded the patients whose lesion-history was longer than 14 days and had history of treatments or surgeries carried out in their Achilles tendon.

All the patients were operated on by the percutaneous technique with Dresden's rackets as described by Amlang et al.[6] At the time of hospital discharge, all the patients kept the heeled immobilization applied postoperatively.

We carried out regular checkups at postoperative days 14 and 28, when we evaluated the surgical wound and removed the heel from the immobilizing boot. Stitches were removed between 14 and 21 days after the surgery. The rehabilitating kinesiology protocol started at 14-to-28 postoperative day.

All the patients were subject to regular checkups during six months at the very least. We recorded patients' epidemiologic data such as age, sex and affected side. Moreover, we analyzed clinical onset, imaging studies and the time that had passed until the surgery.

Finally we evaluated major and minor complications. We defined re-rupture, surgical wound dehiscence, deep infection and DVT as major complications. This study received approval from the local Ethics Committee; moreover, patients were asked to grant Informed Consent.

Results

We included 60 patients: 58 males (96.66%) and two females (3.33%) in a 29:1-male: female ratio and who were between 18 and 57 years of age (average 38.29 years old). All the patients had shown pain as main symptom at the time of rupture. Ninety-one sixty-six percent of the patients (55 out of the 60) also showed positive Thompson sign and palpable gap. Seven of them (11.66%) attended initial consultation with complementary imaging studies (6 with soft tissues-US and one with ankle-IMR). These studies had been asked for by GPs before referring the patients to Orthopedics.

The time that passed between the injury and the surgery was, on average, 4.28 days (ranging from 1 to 12).

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We did not register major complications such as re-ruptures, surgical wound dehiscence, deep infection or DVT.

Seven patients suffered minor complications (11.66%), which were successfully treated with no need for re-operation (Table).

We registered the cases of three patients (5%) with superficial infection in their surgical wounds, which was managed with a 10-day treatment of cefradoxil and satisfactory results. One patient (1.66%) showed paresthesia in their sural nerve region, with spontaneous resolution five weeks later. Another patient suffered peroneal tendonitis two weeks after starting kinesiology. Two patients consulted due to hypertrophic scar and esthetic results in their surgical scars and were referred to occupational therapy for surgical wound management.

Table. Complications

	n	%
Major complications	0	0%
Minor complications	7	11,66%
Pain Peroneal tendonitis Petitendonitis	1	1.66%
Paresthesia in sural nerve region*	1	1.66%
Surgical wound complications Redness and serous leaking* Delay in stitches removal	3	5.0%
Scar complications Hypertrophic scar Aesthetics*	2	3.3%

*Self-limiting condition.

Discussion

Rupture of the Achilles tendon rates have increased significantly over the past 30 years.[4] This is largely due to an older active population and the so-called "weekend warriors".[7] This lesion is seen preferably in the male sex with reported ratios of 3:1 to 20:1-male: female. In the population this study was conducted in, we verified even higher ratios: Only two women out of the 60 assessed patients (29:1-male: female ratio).

The rupture of the Achilles tendon has a bimodal distribution, with a first peak between 25 and 40 years of age, and a second peak in >60 year-old people.[3,8] In this study, the patients 'average age was 38 years old (ranging from 18 to 57), especially because of the sport background. There were no >60 year-old patients.

The diagnosis of this entity is based on medical history. Research typically describes a 40 year-old patient who reports pain on the dorsal aspect of the distal third of their leg while practicing a high-impact sport, with stoning or kicking sensation in calf or heel; moreover, they may refer an audible click and weakness in plantar flexion, and also gait impairment.[3,7-9] All those who participated in this study consulted due to pain as their main symptom.

It is striking that a percentage of patients has negative Thompson sign, something that may be attributed to the incomplete rupture of the Achilles tendon, what may allow the soleus and deep flexor muscles to aid in ankle plantar flexion.[3,10,11] Although diagnosis is made on the basis of medical history, in our study 11.66% of the patients consulted with complementary studies (6 with US and one with IMR), all of them reporting incomplete rupture of the Achilles tendon.

The treatment of the rupture of the Achilles tendon can be divided into conservative and surgical treatments. Conservative treatment includes immobilization plus cast or functional rehabilitation with different kinds of immobilizers or orthoses. Surgical treatment can be divided into open surgery, mini-invasive surgery and percutaneous techniques.

There is neither agreement on treatment nor reference patterns for the treatment of this lesion, although there are many publications about it.[12-15]

Studies have shown that the patients who receive conservative treatment with functional protocols of rehabilitation do not differ from those who are subject to surgery in terms of re-rupture, calf circumference and articular range of motion.[16-18] However, there are reports on classical conservative treatment with immobilizer cast or walker boot (from 6 to 8 weeks) and no rehabilitating kinesiology protocol being associated with higher rates of re-rupture and complications related to immobilization such as joint rigidity, articular contracture, cutaneous lesions and superficial infections.[19,20]

From a financial point of view, there are reports on differences of up to 100% per patient in total costs due to the type of treatment that they have received (surgical treatment= USD 4929 and conservative treatment= USD 2432, not medical leaves of absence considered). Notwithstanding, it was verified that surgical treatment requires less checkup consultations, shorter physiotherapy times and it is associated with early working reinsertion.[21]

Among the advantages that surgery offers there is earlier return to physical activity, less muscular atrophy, greater joint range of motion, more strength in plantar flexion and less risk of re-rupture.[3,15,22,23] What is more, in patients treated with percutaneous techniques, there is early working reinsertion, better esthetic results and lower rates of complications in surgical wounds as compared to those subject to open surgery techniques.[22]

Patients should be informed about some high-profiled complications that are inherent in the surgical treatment, such as infection and surgical wound dehiscence, sural nerve dysfunction, ankle rigidity and complications associated with surgical wound healing.[3,16,22]

In a retrospective study, they compared open and percutaneous surgical techniques and did not find functional differences in dorsal and plantar ankle flexion or leg circumference. They did verify shorter working reinsertion times (2.8 months in percutaneous techniques as compared with 5.6 months in open techniques). Cosmetic results were better in the group subject to percutaneous techniques, with smaller scars and better patients' subjective evaluation. Finally, at the time of comparing complication rates, there were more complications in the open techniques group (re-rupture, surgical wound dehiscence and infection).[22]

In our study there were no major complications, and seven patients underwent minor complications, figures which are similar to those reported in specialized literature.[3,16,22]

Based on our clinical data and the current bibliography on the subject, we can confirm that the percutaneous technique described by Amlgan et al.[6] is reproducible and safe, with low complication rates, and it is highly recommendable in the treatment of this type of lesions.

Among the strengths of our study, we should highlight the number of patients that we assessed and the fact that they were operated on by a sole surgeon (who is the senior author of this work), and that we used a unique rehabilitation kinesiology protocol. The study limitations include its descriptive retrospective design. On the other hand, we did not evaluate the patients' function and satisfaction scores, and we did not make comparisons with other surgical techniques and control groups.

New prospective randomized studies should be carried out so as to determine the optimal management of the patients with rupture of their Achilles tendon.

Conclusions

The percutaneous surgical technique with Dresden's rackets is safe and reliable for the treatment of the rupture of the Achilles tendon, with low complication rates. Surgery complications in this study were similar to those reported in international literature.

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